National Institute of Environmental Health Sciences

Defining indoor heat thresholds for health in the UK

Author(s): anderson M, Carmichael C, Murray V, Dengel A, Swainson M
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Abstract:

INTRODUCTION: It has been recognised that as outdoor ambient temperatures increase past a particular threshold, so do mortality/morbidity rates. However, similar thresholds for indoor temperatures have not yet been identified. Due to a warming climate, the non-sustainability of air conditioning as a solution, and the desire for more energy-efficient airtight homes, thresholds for indoor temperature should be defined as a public health issue. AIMS: The aim of this paper is to outline the need for indoor heat thresholds and to establish if they can be identified. Our objectives include: describing how indoor temperature is measured; highlighting threshold measurements and indices; describing adaptation to heat; summary of the risk of susceptible groups to heat; reviewing the current evidence on the link between sleep, heat and health; exploring current heat and health warning systems and thresholds; exploring the built environment and the risk of overheating; and identifying the gaps in current knowledge and research. METHODS: A global literature search of key databases was conducted using a pre-defined set of keywords to retrieve peer-reviewed and grey literature. The paper will apply the findings to the context of the UK. RESULTS: A summary of 96 articles, reports, government documents and textbooks were analysed and a gap analysis was conducted. Evidence on the effects of indoor heat on health implies that buildings are modifiers of the effect of climate on health outcomes. Personal exposure and place-based heat studies showed the most significant correlations between indoor heat and health outcomes. However, the data are sparse and inconclusive in terms of identifying evidence-based definitions for thresholds. Further research needs to be conducted in order to provide an evidence base for threshold determination. CONCLUSIONS: Indoor and outdoor heat are related but are different in terms of language and measurement. Future collaboration between the health and building sectors is needed to develop a common language and an index for indoor heat and health thresholds in a changing climate.

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Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature: ☑

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified, Non-United States

Non-United States: Europe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Morbidity/Mortality

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly

Other Vulnerable Population: residents of certain types of dwellings, inability to adapt to certain behaviors; pre-existing health conditions

Resource Type: ☑

format or standard characteristic of resource

Review

Resilience: ☑

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☑

time period studied

Time Scale Unspecified